

Mocniny, odmocniny, absolutní hodnota

1. $0,136 \cdot 10^3 + 621 \cdot 10^{-3} - 0,189 \cdot 10^2 =$
 $= 0,136 \cdot 1000 + 621 \cdot 0,001 - 0,189 \cdot 100 =$
 $= 136 + 0,621 - 18,9 =$
 $= 136,621 - 18,900 = \underline{\underline{117,721}}$

Odečítáme na řádku
nebo pod sebou

$$\begin{array}{r} 136,621 \\ - 18,900 \\ \hline 117,721 \end{array}$$

D)

2. $\sqrt{81} \cdot \sqrt[3]{64} - \sqrt{4} \cdot \sqrt[3]{8} - \sqrt{16} \cdot \sqrt[3]{27} =$
 $= \sqrt{9 \cdot 9} \cdot \sqrt[3]{4 \cdot 4 \cdot 4} - \sqrt{2 \cdot 2} \cdot \sqrt[3]{2 \cdot 2 \cdot 2} - \sqrt{4 \cdot 4} \cdot \sqrt[3]{3 \cdot 3 \cdot 3} =$
 $= \underbrace{9 \cdot 4} - \underbrace{2 \cdot 2} - \underbrace{4 \cdot 3} =$
 $= 36 - 4 - 12 =$
 $= 32 - 12 =$
 $= \underline{\underline{20}}$

C)

3. $1^2 = 1$; $(-1)^2 = 1$; $-1^2 = -(1 \cdot 1) = -1$
 $1^3 = 1$; $(-1)^3 = (-1) \cdot (-1) \cdot (-1) = -1$; $-1^3 = -(1 \cdot 1 \cdot 1) = -1$
 PROOF: $(-1)^2 \neq -1^2$
 $(-1)^3 = -1^3$

$$\frac{1^2 - 1^3 - (-1)^4}{\left(\sqrt{\frac{1}{9}} : \frac{\sqrt{4}}{3}\right) : \sqrt{\frac{25}{36}}} = \frac{1 - 1 - 1}{\left(\frac{\sqrt{1}}{\sqrt{9}} : \frac{\sqrt{4}}{3}\right) : \frac{\sqrt{25}}{\sqrt{36}}} = \frac{-1}{\frac{1}{3} : \frac{2}{3} : \frac{5}{6}} =$$

admoční x lomzu

$$= \frac{-1}{\frac{1}{3} \cdot \frac{3}{2} \cdot \frac{6}{5}} = - \frac{1}{\frac{3}{5}} = - \frac{1}{1} \cdot \frac{5}{3} = - \frac{5}{3}$$

složení x lomzu

B)

$$\begin{aligned} 4. \quad 24\ 680 &= 2 \cdot 10\,000 + 4 \cdot 1\,000 + 6 \cdot 100 + 8 \cdot 10 + 0 = \\ &= 2 \cdot 10^4 + 4 \cdot 10^3 + 6 \cdot 10^2 + 8 \cdot 10^1 + 0 \cdot 10^0 \end{aligned}$$

Číslo 1 na nultou je 1 (např. $10^0 = 1$, $(-2)^0 = 1$, $(\frac{6}{5})^0 = 1$)

Nula krát cokoliv je 0 (např. $0 \cdot 10^0 = 0 \cdot 1 = 0$)

$$\left. \begin{aligned} 0 \cdot 37 &= 0 \\ 0 \cdot 2 \cdot (-3) \cdot \frac{3}{2} &= 0 \end{aligned} \right) \quad \text{D)}$$

5. $\left(\frac{2}{4} \cdot \frac{3}{4}\right)^2 = \left(\frac{1}{4} \cdot \frac{3}{2}\right)^2 = \left(\frac{3}{8}\right)^2 = \frac{3^2}{8^2} = \frac{9}{64}$ zlomek v základním tvaru

6.

$$\frac{3^2 - (-3)^3}{3^{-2} - 3^0} = \frac{-9 - (-27)}{\frac{1}{9} - 1} = \frac{-9 + 27}{\frac{1-9}{9}} = \frac{18}{-\frac{8}{9}} = \frac{18}{1} \cdot \left(-\frac{9}{8}\right) =$$

↓

$$= \frac{9 \cdot (-9)}{4} = -\frac{81}{4}$$

$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$

A)

7. A) $30^2 \neq 2^{30}$ ($30^2 < 2^{30}$)
 $30^2 = 30 \cdot 30 = 900$
 $2^{30} = 2^{(10+10+10)} = 2^{10} \cdot 2^{10} \cdot 2^{10} = 1024 \cdot 1024 \cdot 1024 = \dots$

B) $(6^2)^3 \neq 6^2 \cdot 6^3$ ($6^6 > 6^5$)
 $(6^2)^3 = 6^{2 \cdot 3} = 6^6$
 $6^2 \cdot 6^3 = 6^{(2+3)} = 6^5$

C) $5 \cdot 2^2 \neq 100$ ($20 < 100$)
 $5 \cdot 2^2 = 5 \cdot 4 = 20$

D) $\sqrt{12^4} = 12^2$
 $\sqrt{12^4} = \sqrt{12^{(2+2)}} = \sqrt{12^2 \cdot 12^2} = \sqrt{12^2} \cdot \sqrt{12^2} = 12 \cdot 12 = 12^2$
 nebo $\sqrt{12^4} = \sqrt{(12^2)^2} = (\sqrt{12^2})^2 = (12)^2 = 12^2$ D)

8. $|2 - |3 - 4|| - |5 - 5^2| =$ Opačné číslo & číslo
 $= |2 - |-1|| - |5 - 25| =$
 $= |2 - 1| - |-20| =$
 $= |1| - 20 =$
 $= 1 - 20 = -19$
 -19 je $(-19) \cdot (-1) = \underline{19}$

9. $(3x - 4y)^2 - (6y - 2x)^2 = 9x^2 - 24xy + 16y^2 - (36y^2 - 24xy + 4x^2) =$
 $= 9x^2 - 24xy + 16y^2 - 36y^2 + 24xy - 4x^2 =$
 $= 5x^2 - 20y^2 = 5 \cdot (x^2 - 4y^2) =$
 $= 5 \cdot (x - 2y) \cdot (x + 2y)$

$(A - B)^2 = (A - B) \cdot (A + B)$

$$10. \quad 4a^2 - 36b^2 = 4 \cdot (a^2 - 9b^2) = 4 \cdot (a^2 - 3^2 \cdot b^2) =$$

$$= 4 \cdot [a^2 - (3b)^2] = \underline{4 \cdot (a - 3b) \cdot (a + 3b)}$$

VZOREC: $A^2 - B^2 = (A - B) \cdot (A + B)$

$$11. \quad (0,25r + *)^2 = * + * + 9s^2$$

$$\text{VZOREC: } (A + B)^2 = A^2 + 2AB + B^2$$

$$B^2 = 9s^2$$

$$B = \sqrt{9s^2} = 3s$$

$$A = 0,25r = \frac{1}{4}r = \frac{r}{4}$$

$$A^2 = \left(\frac{r}{4}\right)^2 = \frac{r^2}{16}$$

$$2 \cdot A \cdot B = 2 \cdot \frac{r}{4} \cdot 3s = \frac{3rs}{2}$$

$$\underline{(0,25r + 3s)^2 = \frac{r^2}{16} + \frac{3rs}{2} + 9s^2}$$

$$\text{nebo } (0,25r + 3s)^2 = 0,0625r^2 + 1,5rs + 9s^2$$

Zlomky, výrazy se zlomky, smíšená čísla

1. a) $A \cdot B = C \Rightarrow B = C : A$
 $\frac{2}{7} \cdot \dot{?} = 2 \quad \dot{?} = 2 : \frac{2}{7} = 2 \cdot \frac{7}{2} = \frac{7}{1} = \underline{7}$

b) $A : B = C \Rightarrow A = C \cdot B$
 $\dot{?} : \frac{1}{2} = \frac{1}{2} \quad \dot{?} = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$

c) $A - B = C \Rightarrow B = A - C$
 $\frac{2}{3} - \dot{?} = -\frac{7}{12} \quad \dot{?} = \frac{2}{3} - \left(-\frac{7}{12}\right) = \frac{2}{3} + \frac{7}{12} =$
 $= \frac{8+7}{12} = \frac{15}{12} = \frac{5}{4}$

2. a) $\frac{6}{7} - \frac{7}{3} = \frac{3 \cdot 6 - 7 \cdot 7}{21} = \frac{18 - 49}{21} = \frac{-31}{21} = -\frac{31}{21} \rightarrow \text{číslo nesoudělné}$

b) $3\frac{2}{3} : \frac{1}{2} = \frac{11}{3} \cdot \frac{2}{1} = \frac{22}{3}$
 ↓ smíšené číslo

c) $\frac{12 - \frac{4}{3}}{12} = \frac{\frac{36-4}{3}}{12} = \frac{32}{3} \cdot \frac{1}{12} = \frac{8}{3} \cdot \frac{1}{3} = \frac{8}{9}$

3. $\frac{143}{100} = 143 : 100 = 1,43$

$\frac{36}{25} = 36,00 : 25 = 1,44$
 $\begin{array}{r} 140 \\ 100 \\ 0 \end{array}$

$1,43 = 1,434343 \dots \approx 1,43$

$1,43$

Největší číslo je $\frac{36}{25}$.

U všech čísel nás zajímá číslice na místě setin.

4. *o dzieli*

$$0,5 - \frac{1}{5} = \frac{5}{10} - \frac{1}{5} = \frac{1}{2} - \frac{1}{5} = \frac{5-2}{10} = \frac{3}{10} = \underline{\underline{0,3}}$$

nebo

$$0,5 - \frac{1}{5} = 0,5 - 0,2 = \underline{\underline{0,3}}$$

o 0,3

5.

$$2 - 2\frac{1}{3} \cdot \frac{3}{5} + 2,5 =$$

$$= 2 - \frac{7}{3} \cdot \frac{3}{5} + 2,5 =$$

$$= 2 - \frac{7}{5} + 2,5 =$$

$$= 2,0 - 1,4 + 2,5 =$$

$$= 0,6 + 2,5 = 3,1 = \underline{\underline{\frac{31}{10}}}$$

nebo $2 - 2\frac{1}{3} \cdot \frac{3}{5} + 2,5 =$

$$= \frac{2}{1} - \frac{7}{3} \cdot \frac{3}{5} + \frac{25}{10} =$$

$$= \frac{2}{1} - \frac{7}{5} + \frac{5}{2} = \frac{20-14+25}{10} =$$

$$= \underline{\underline{\frac{31}{10}}}$$

A)

6.

$$\frac{\frac{7}{3}}{\frac{4}{4}} = \frac{7}{1} \cdot \frac{4}{3} = \frac{28}{3} = 9\frac{1}{3}$$

D)

7.

$$4\frac{1}{5} \cdot 10 = 4,2 \cdot 10 = \underline{\underline{42}}$$

$$\checkmark \downarrow 4\frac{1}{5} = 4 + \frac{1}{5} = 4 + 0,2 = 4,2$$

nebo

$$\downarrow 4\frac{1}{5} = \frac{21}{5} = \frac{21:5}{10} = 4,2$$

C)

8.

$\xrightarrow{\text{Rozšiřování}}$
 $\xleftarrow{\text{Krácení}}$

Rozšířit zlomek znamená vynásobit čitatele i jmenovatele zlomku stejným číslem, různým od nuly.
 Velikost zlomku se nemění.

$$\frac{0,4}{3\frac{1}{3}} \cdot \frac{3}{3} = \frac{\frac{4}{10}}{\frac{10}{3}} \cdot \frac{3}{3} = \frac{\frac{12}{10}}{\frac{30}{3}} = \frac{12^2}{10} \cdot \frac{3}{30 \cdot 5} = \frac{2^1}{10 \cdot 5} \cdot \frac{3}{5} = \frac{3}{25} =$$

$$\stackrel{1}{=} = \frac{300}{50} : 25 = \underline{\underline{0,12}}$$

nebo

$$\frac{0,4}{3\frac{1}{3}} \cdot \frac{3}{3} = \frac{0,4}{(3 + \frac{1}{3})} \cdot \frac{3}{3} = \frac{1,2}{9 + \frac{1}{3}} = \frac{1,2}{10} = \underline{\underline{0,12}}$$

$$\frac{0,4}{3\frac{1}{3}} = \frac{\frac{4}{10}}{\frac{10}{3}} = \frac{4^2}{10 \cdot 5} \cdot \frac{3}{10} = \frac{2^1}{5} \cdot \frac{3}{10 \cdot 5} = \frac{3}{25} = \underline{\underline{0,12}}$$

D)

9.

Číslo

Převrácená hodnota čísla

5

 $\frac{1}{5}$
 $\frac{4}{7}$

$$\frac{1}{\frac{4}{7}} = \frac{1}{1} \cdot \frac{7}{4} = \underline{\underline{\frac{7}{4}}}$$

$$0,8 = \frac{1}{0,8} = \frac{1}{\frac{8}{10}} = \frac{1}{\frac{4}{5}} = \frac{1}{1} \cdot \frac{5}{4} = \underline{\underline{\frac{5}{4}}}$$

C)

10. Dvě největší čísla : 3,706; 3,607
Dvě nejmenší čísla : 3,076; 3,067

$$\begin{aligned} & (3,706 + 3,607) - (3,076 + 3,067) = \\ & = 7,313 - 6,143 = \\ & = 1,170 = \underline{\underline{1,17}} \quad \text{D)} \end{aligned}$$

11. Martin uběhl 500m

Petr uběhl $\frac{4}{5} \times 500 = 500 : 5 \cdot 4 = 100 \cdot 4 = 400\text{m}$

Jirka uběhl $\frac{4}{5} \times 400 = 400 : 5 \cdot 4 = 80 \cdot 4 = \underline{\underline{320\text{m}}}$ D)

12. V košíku je 54 třešní (4 celky)

Monika si vzala 6 třešní, $\frac{1}{9} \times 54$ ($54 : 9 = 6$)

Honza si vzal $\frac{1}{3} = \frac{3}{9}$ $\frac{1}{9} \cdot 3 = 6 \cdot 3 = 18$ třešní

celky je $\frac{9}{9}$

V košíku zůstalo $\frac{9}{9} - \frac{1}{9} - \frac{3}{9} = \frac{9}{9} - \frac{4}{9} = \frac{5}{9}$ třešní

$\frac{5}{9} = 6 \cdot 5 = 30$ třešní

13.

$$\left[3 - 2 \cdot \left(\frac{1}{3} - \frac{1}{2} \right) : \left(\frac{1}{3} - \frac{3}{4} \right) \right] =$$

$$= \left[3 - 2 \cdot \left(\frac{2-3}{6} \right) : \left(\frac{4-9}{12} \right) \right] =$$

$$= \left[3 - 2 \cdot \left(-\frac{1}{6} \right) : \left(-\frac{5}{12} \right) \right] =$$

$$= \left[3 + \frac{1}{3} \cdot \left(-\frac{12}{5} \right) \right] =$$

$$= 3 - \frac{4}{5} = \frac{15-4}{5} = \frac{11}{5} =$$

$$= \frac{11}{5} : 5 = \frac{11}{10} = 2,2$$

14.

$$3\frac{1}{2} - 2\frac{3}{4} = \frac{7}{2} - \frac{11}{4} = \frac{14-11}{4} = \frac{3}{4} \quad \text{rozdíl}$$

$$3\frac{1}{2} + 2\frac{3}{4} = \frac{7}{2} + \frac{11}{4} = \frac{14+11}{4} = \frac{25}{4} \quad \text{součet}$$

rozdíl • hledané číslo = součet

hledané číslo = součet : rozdíl

$$\frac{25}{4} : \frac{3}{4} = \frac{25}{4} \cdot \frac{4}{3} = \frac{25}{3} = 8\frac{1}{3}$$

15.

$$\begin{aligned}
 & \frac{\frac{1}{6} - \frac{3}{4}}{\frac{5}{8} - \frac{11}{12}} \cdot \left[\left(\frac{5}{6} - \frac{1}{2} \right) : \left(\frac{2}{3} - \frac{1}{4} \right) \right] = \\
 & = \frac{\frac{2-9}{12}}{\frac{15-22}{24}} \cdot \left[\left(\frac{5-3}{6} \right) : \left(\frac{8-3}{12} \right) \right] = \\
 & = \frac{-\frac{7}{12}}{-\frac{7}{24}} \cdot \left(\frac{\cancel{2}^1}{\cancel{6}_3} : \frac{5}{12} \right) = \\
 & = \frac{7}{12} : \frac{7}{24} \cdot \left(\frac{1}{\cancel{3}_1} \cdot \frac{\cancel{12}^4}{5} \right) = \\
 & = \frac{\cancel{7}^1}{\cancel{12}_1} \cdot \frac{\cancel{24}^2}{\cancel{7}_1} \cdot \frac{4}{5} = \underline{\underline{\frac{8}{5}}}
 \end{aligned}$$

16.

$$\begin{aligned}
 & 5 - \frac{1}{5 - \frac{1}{5}} = \\
 & = 5 - \frac{1}{\frac{25-1}{5}} = \\
 & = 5 - \frac{1}{\frac{24}{5}} = 5 - \frac{5}{24} = \\
 & = \frac{120-5}{24} = \frac{115}{24} = 4 \frac{19}{24}
 \end{aligned}$$

17.

$$\begin{aligned}
& \frac{0,25 - 1\frac{1}{5}}{-3\frac{4}{5} + 1,9} + \frac{10 - 2,5}{\frac{1}{2} - 0,75} = \\
& = \frac{\frac{1}{4} - \frac{6}{5}}{-\frac{19}{5} + \frac{19}{10}} + \frac{\frac{10}{1} - \frac{25}{10} \cdot 5}{\frac{1}{2} - \frac{3}{4}} = \\
& = \frac{\frac{5-24}{20}}{\frac{-38+19}{10}} + \frac{\frac{20-5}{2}}{\frac{2-3}{4}} = \\
& = \frac{-\frac{19}{20}}{-\frac{19}{10}} + \frac{\frac{15}{2}}{-\frac{1}{4}} = \\
& = \frac{\cancel{19}^1 \cdot \cancel{10}^1}{\cancel{20}_2 \cdot \cancel{19}_1} - \frac{15 \cdot 4^2}{2 \cdot 1} = \\
& = \frac{1}{2} - 30 = 0,5 - 30 = \underline{\underline{-29,5}}
\end{aligned}$$

18.

a) DAVID, FILIP, ADAM, CYRIL, EMIL, BORIS

$$44,881 < 44,905 < 45,017 < 45,398 < 45,899 < 46,021$$

b) 1. čtveřice : DAVID, FILIP, ADAM, CYRIL
 2. čtveřice : FILIP, ADAM, CYRIL, EMIL } 2 řešení

19. Hledaná čísla zjistíme:

$$3,02 + 0,1 = \underline{\underline{3,12}}$$

$$3,12 - 3,02 = 0,1$$

$$3,02 - 0,10 = \underline{\underline{2,92}}$$

$$3,02 - 2,92 = 0,1$$

20.

1. skupina: $1,246 + 1,354 + 1,4 = 4$

2. skupina: $1,28 + 1,72 = 3$

3. skupina: $1,45 + 1,55 = 3$

21. označ x celková cena počítače v Kč

já jsem našetřil $\frac{2}{5}x$ Kč

bratr našetřil $0,35x$ Kč

musíme ještě našetřít 3200 Kč

a)

$$\begin{aligned} \frac{2}{5}x + 0,35x + 3200 &= x \\ 0,4x + 0,35x + 3200 &= x \\ 0,75x + 3200 &= x \quad | - 0,75x \\ 3200 &= 0,25x \\ 3200 &= \frac{1}{4}x \quad | \cdot 4 \\ 12800 &= x \\ \underline{\underline{x &= 12800 \text{ Kč}}} \end{aligned}$$

b) já jsem našetřil $\frac{2}{5} \times 12800 = 12800 : 5 \cdot 2 =$
 $= 2560 \cdot 2 = \underline{\underline{5120 \text{ Kč}}}$

bratr našetřil $0,35 \times 12800 = \frac{7}{20} \times 12800 =$

$0,35 = \frac{35}{100} = \frac{7}{20}$

$= 12800 : 20 \cdot 7 =$
 $= 640 \cdot 7 = \underline{\underline{4480 \text{ Kč}}}$

22. označ x výšou tatky v cm $1m = 100cm$

$$\text{výška tatky} + \text{výška syna} = 3m$$

$$x + \frac{2}{3}x = 300cm \quad | \cdot 3$$

$$3x + 2x = 900$$

$$5x = 900 \quad | :5$$

$$x = \underline{180cm} \quad \text{výška tatky}$$

$$\text{výška syna} : \frac{2}{3} \times 180 = 180 : 3 \cdot 2 = 60 \cdot 2 = \underline{120cm}$$

výška mámy

označ y výšou mámy

$$\frac{20}{19}y = 180 (\text{výška tatky})$$

$$20y = 180 \cdot 19$$

$$20y = 3420 \quad | :2$$

$$y = \underline{171cm}$$

$$\begin{array}{r} 180 \\ \times 19 \\ \hline 1620 \\ 180 \\ \hline 3420 \end{array}$$

$$\text{výška dcery} : \frac{2}{3} \times 171 = 171 : 3 \cdot 2 = 57 \cdot 2 = \underline{114cm}$$

23.

$$\frac{1\frac{2}{5} - \frac{15^5 \cdot 2^1}{42 \cdot 3^1}}{(-2)^3 + (-4)^2 - 3^2} = \frac{\frac{7}{5} - \frac{5}{2}}{-8 + 16 - 9} = \frac{\frac{14 - 25}{10}}{-1} = \frac{-\frac{11}{10}}{-1} =$$

$$= \frac{11}{10} = \underline{1.1}$$

b)

$$\begin{aligned}
 24. \quad & \frac{(81 \cdot 2^3)^2}{(-3)^5 \cdot 4} \cdot \frac{(-2)^4 \cdot 3}{(6^3)^2} = \\
 & = \frac{(9^2 \cdot 2^3)^2}{(-3)^5 \cdot 2^2} \cdot \frac{2^4 \cdot 3}{[(2 \cdot 3)^3]^2} = \\
 & = \frac{(3^4 \cdot 2^3)^2}{-3^5 \cdot 2^2} \cdot \frac{2^4 \cdot 3}{(2^3 \cdot 3^3)^2} = \\
 & = \frac{\cancel{3^8} \cdot \cancel{2^6}^1}{\cancel{-3^5} \cdot \cancel{2^2}^1} \cdot \frac{\cancel{2^4}^2 \cdot \cancel{3}^1}{\cancel{2^6}^1 \cdot \cancel{3^6}^5} = \\
 & = \frac{\cancel{3^3}^1}{-1} \cdot \frac{2^2}{3^5 \cancel{2}^2} = -\frac{4}{9}
 \end{aligned}$$

$$\begin{aligned}
 (a^r)^p &= a^{r \cdot p} \\
 a^r \cdot a^p &= a^{r+p} \\
 \frac{a^r}{a^p} &= a^{r-p} \\
 (a \cdot b)^r &= a^r \cdot b^r
 \end{aligned}$$

$$9^2 = (3^2)^2 = 3^4$$

$$(-3)^5 = -3^5$$

c)

25.

$$\begin{aligned}
 & \frac{\left(-\frac{2}{5}\right)^2 \cdot \frac{5}{\sqrt{16}} + 0,6 \div \sqrt{\frac{9}{4}}}{\left(-\frac{1}{3} + \frac{1}{6}\right) : \left(-\frac{5}{3}\right)} = \\
 & = \frac{\frac{\cancel{4}^2 \cdot \cancel{5}^1}{\cancel{25}^5 \cdot \cancel{4}^2} + \frac{\cancel{6}^2 \cdot \cancel{2}^1}{\cancel{10}^5 \cdot \cancel{3}^1}}{\frac{-2+1}{6} \cdot \left(-\frac{3}{5}\right)} = \\
 & = \frac{\frac{1}{5} + \frac{2}{5}}{-\frac{1}{6} \cdot \left(-\frac{\cancel{3}}{5}\right)} = \\
 & = \frac{\frac{3}{5}}{\frac{1}{10}} = \frac{3}{\cancel{5}^1} \cdot \frac{\cancel{10}^2}{1} = 6
 \end{aligned}$$

b)

26.

$$\begin{aligned}
 & \left(-\frac{3}{2} \right)^2 - \left[\frac{5}{4} \cdot \frac{5}{(-6)_2} - \sqrt{\frac{1}{4} \cdot \frac{2}{136}} \cdot 3 \right] = \\
 & = \frac{9}{4} - \left(-\frac{5}{8} - \frac{1}{2_1} \cdot \frac{2^1}{6_2} \cdot 3_1 \right) = \\
 & = \frac{9}{4} - \left(-\frac{5}{8} - \frac{1}{2} \right) = \\
 & = \frac{9}{4} - \left(\frac{-5-4}{8} \right) = \frac{9}{4} + \frac{9}{8} = \frac{18+9}{8} = \underline{\underline{\frac{27}{8}}}
 \end{aligned}$$

D)

27.

$$\begin{aligned}
 & \left(8\frac{1}{3} : 2\frac{2}{9} \right) \cdot \frac{8}{18} - \left(3\frac{1}{18} : 1\frac{14}{27} \right) \cdot 3\frac{1}{5} + \left(7\frac{1}{5} : \frac{18}{25} \right) \cdot 3\frac{1}{10} = \\
 & = \frac{25}{3} : \frac{20}{9} \cdot \frac{4}{9} - \frac{55}{18} : \frac{44}{27} \cdot \frac{16}{5} + \frac{36^2}{5} \cdot \frac{25^5}{18_1} \cdot \frac{31}{10_2} = \\
 & = \frac{25 \cdot 9 \cdot 4^1}{3 \cdot 20 \cdot 9_1} - \frac{55^5 \cdot 27^3 \cdot 16}{18_2 \cdot 44_4 \cdot 5} + \frac{2 \cdot 5 \cdot 31}{5 \cdot 1 \cdot 2} = \\
 & = \frac{25^5}{3 \cdot 5_1} - \frac{5 \cdot 3 \cdot 16^2}{2 \cdot 4 \cdot 5} + 31 = \\
 & = \frac{5}{3} - 6 + 31 = \frac{5}{3} + 25 = 1\frac{2}{3} + 25 = 26\frac{2}{3}
 \end{aligned}$$

B)

Lomené výrazy

$$1. \frac{2a+2}{a+1} - \frac{a+1}{a} =$$

Podmínky: $a+1 \neq 0 \quad | -1$
 $\underline{a \neq -1}$
 $\underline{a \neq 0}$

$$= \frac{(2a+2) \cdot \cancel{a} - (a+1) \cdot \cancel{(a+1)}}{(\cancel{a+1}) \cdot \cancel{a}} =$$

Výraz ve jmenovateli musí být různý od nuly, protože nulou nelze dělit.

$$= \frac{2a^2+2a - (a^2+2a+1)}{(a+1) \cdot a} =$$

$$= \frac{2a^2+2a - (a^2+2a+1)}{(a+1) \cdot a} =$$

Společný jmenovatel =
= nejmenší společný násobek.

$$= \frac{2a^2+2a - a^2 - 2a - 1}{(a+1) \cdot a} =$$

$$= \frac{a^2 - 1}{(a+1) \cdot a} = \frac{(A+B) \cdot (A-B)}{(a+1) \cdot a} =$$

$$= \frac{a-1}{a}$$

2.

$$\frac{\cancel{5x}^1 \cdot 1}{x+2} \cdot \frac{x^2+4x+4}{\cancel{10x}^2 \cdot 2} =$$

Podmínky:

$$\begin{array}{l} x+2 \neq 0 \quad | -2 \\ \underline{x \neq -2} \end{array} ; \quad \begin{array}{l} 10x^2 \neq 0 \quad | :10 \\ x^2 \neq 0 \quad | \sqrt{} \\ \underline{x \neq 0} \end{array}$$

$$= \frac{1}{\cancel{x+2}_1} \cdot \frac{(x+2)^2}{2x} = \frac{x+2}{2x}$$

$$A^2 + 2AB + B^2 = (A+B)^2$$

3.

$$\begin{aligned}
 & \frac{4y}{y-4} : \frac{y^2}{y^2-16} = \\
 & = \frac{4y}{y-4} \cdot \frac{y^2-16}{y^2} = \\
 & = \frac{4\cancel{y}}{\cancel{y-4}} \cdot \frac{(\cancel{y-4}) \cdot (y+4)}{y^2} = \\
 & = \frac{4}{1} \cdot \frac{y+4}{y} = \frac{4 \cdot (y+4)}{y} = \\
 & = \frac{4y+16}{y}
 \end{aligned}$$

Podmiany:

$$y-4 \neq 0 \mid +4$$

$$\underline{y \neq 4}$$

$$y^2 \neq 0 \mid \sqrt{}$$

$$\underline{y \neq 0}$$

$$y^2-16 \neq 0$$

$$(y-4) \cdot (y+4) \neq 0$$

$$y-4 \neq 0 \text{ albo } y+4 \neq 0$$

$$\underline{y \neq 4} \quad \underline{y \neq -4}$$

$$\underline{y \neq \pm 4}$$

albo

$$y^2-16 \neq 0 \mid +16$$

$$y^2 \neq 16 \mid \sqrt{}$$

$$y \neq (\pm\sqrt{16} = \pm 4)$$

4.

$$\begin{aligned}
 & \frac{x - \frac{y^2}{x}}{x+y} = \frac{\frac{x^2 - y^2}{x}}{x+y} = \\
 & = \frac{x^2 - y^2}{x} \cdot \frac{x+y}{1} = \\
 & = \frac{(x-y) \cdot (\cancel{x+y})}{x} \cdot \frac{1}{\cancel{x+y}} = \\
 & = \frac{x-y}{x}
 \end{aligned}$$

Podmiany:

$$\underline{x \neq 0} \quad x+y \neq 0 \mid -y$$

$$\underline{x \neq -y}$$

5.

$$\frac{2-x}{2+x} : \left(1 - \frac{2}{x}\right) =$$

$$= \frac{2-x}{2+x} : \frac{x-2}{x} =$$

$$= \frac{2-x}{2+x} \cdot \frac{x}{x-2} =$$

$$= \frac{2-x}{2+x} \cdot \frac{x}{-1 \cdot (-x+2)} =$$

$$= \frac{\cancel{2-x}}{2+x} \cdot \frac{x}{-(\cancel{2-x})} =$$

$$= \frac{1}{2+x} \cdot \frac{x}{-1} = -\frac{x}{x+2}$$

Podmiany:

$$x \neq 0; \quad 2+x \neq 0 \mid -2; \quad x-2 \neq 0 \mid +2$$

$$x \neq -2; \quad x \neq 2$$

